Man in Space

National Historic Landmark Theme Study

Phase II

By

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National Park Service

Department of the Interior

August 1984

Man in Space

A National Historic Landmark Theme Study

Introductory Essay

Phase II

Phase II of the Man in Space National Historic Landmark Theme Study has been prepared for the Congress and the National Park System Advisory Board in partial fulfillment of the requirements of P.L. 96-344. The purpose of the Theme Study is to evaluate all resources which relate to the theme of Man in Space and to recommend certain of those resources for designation as National Historic Landmarks.

In Phase I of the Man in Space Theme Study 24 resources were discussed and recommended for designation as National Historic Landmarks. A discussion of these resources and their significance and role in the American Space Program can be found in Phase I of the Man in Space Theme Study. The role and function of resources contained in Phase II fit into the integrated outline of types of resources contained in Phase I. In addition to the 24 resources discussed previously, the following resources are believed to be nationally significant and are recommended for designation as National Historic Landmarks or recognition as nationally significant objects:

Launch Pads

Launch Complex 33 at the U.S. Army White Sands Missile Test Range is recommended for designation as a National Historic Landmark because of its close association with the testing of the V-2 rocket and the origins of the American rocket program. Launch Complex 33 was developed specifically to accommodate V-2 rocket tests at White Sands. The V-2 Gantry Crane and Blockhouse represent the first generation of large scale rocket testing facilities that would eventually lead to the American exploration of space and the first manned landing on the moon. The V-2 provided the technological base upon which the United States would build the Saturn family of rockets that eventually carried Americans to the moon. Launch Complex 33 also provided the facilities at which scores of Americans learned the techniques of launching large rockets.

Spacecraft

The Mercury Spacecraft Friendship 7, Gemini 4 Spacecraft, and the Apollo 11 Command Module are recommended for recognition as nationally significant historic objects although not specifically as National Historic Landmarks because it is thought inappropriate to designate objects in a museum collection displayed in a museum building rather than on a site more suggestive of its historic setting. On the other hand, it is important to recognize the national significance of objects having internal integrity which have contributed critically to the success of the space program and, together, form an integral chapter in that program's story.

These three spacecraft are nationally significant because they represent the three classes of spacecraft that were constructed to carry Americans into space and eventually to the first manned landing on the moon in July 1969. The three spacecraft are the actual flight articles and were used on their respective missions. They each carried one or more crew members and were the only parts of the spaceflight hardware to survive. Each of these spacecraft represents either the first in its series or the most significant in its series. For example, Friendship 7 carried John Glenn into space in Februrary 1962 as the first American to orbit the Earth; Gemini 4 carried Edward White for the first American "space walk," and Apollo 11 carried Neil Armstrong, Buzz Aldrin and Michael Collins on the first successful mission to land on the moon. In recognition of these achievements each of these spacecraft is now housed in the Milestones of Flight Gallery of the National Air and Space Museum in Washington.

Additional Comments

Additional objects at the Air and Space Museum were examined for inclusion in this study. Some, such as Mercury Spacecraft Freedom 7, Gemini 7, and the Skylab 4 Command Module were rejected because more significant examples were found in the museum. Other objects, such as the V-2 Missile, the Vanguard Rocket, the Bell X-1 Plane, and the Pioneer 10 Planetary Probe were rejected because they lacked integrity and, therefore, did not meet the criteria for designation as National Historic Landmarks and ought not to be recognized as a nationally significant historic objects. Additional objects such as the Jupiter-C Rocket, Lunar Module, Lunar Roving Vehicle, M2-F3 Lifting Body, X-15 Plane, Viking Mars Lander and the Voyager 1 Planetary Probe were rejected because either they did not meet the criteria for significance of the National Historic Landmark Program or there was insufficient information on the particular object in the collection to determine its integrity.

NPS Form 10-900
(3-82)

OMB No. 1024-0018
Exp. 10-31-84

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only

received

date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Mercury Spacecraft Friendship 7, Gemini 4 Spacecraft, and Apollo 11 Command Module

and or common

2. Location

street & number National Air and Space Museum ___ not for publication

city, town Washington, DC ___ vicinity of

state code county code

3. Classification

Category	Ownership	Status	Present Use	
___ district	_X_ public	___ occupied	___ agriculture	_X_ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
___ structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
_X_ object	___ in process	_X_ yes: restricted	___ government	___ scientific
	___ being considered	___ yes: unrestricted	___ industrial	___ transportation
		___ no	___ military	___ other:

4. Owner of Property

name Smithsonian Institution

street & number Washington, DC

city, town ___ vicinity of state

5. Location of Legal Description

courthouse, registry of deeds, etc. N/A

street & number

city, town state

6. Representation in Existing Surveys

title None has this property been determined eligible? yes no

date ___ federal ___ state ___ county ___ local

depository for survey records

city, town state

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	___ original site
X good	___ ruins	X altered	X moved date
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

Friendship 7 -- Mercury MA-6

Mercury Friendship 7 Spacecraft is a cone-shaped vehicle 9 feet long, 6 feet 7 inches in diameter at the base weighing 2000 pounds. Friendship 7 was built by the McDonald Aircraft Corporation of St. Louis for Project Mercury-America's program to send a man in to orbit around the Earth.

Atop the manned portion of the cone was a small cylinder containing the parachute, and above that, an antenna can. Straddling the antenna can was a tower with two solid propellant rockets, one an escape rocket to propel the entire capsule away from the launch vehicle in case of emergency prior to launch, and the other a tower jettison rocket to remove the tower and escape rocket after successful launch.[1]

The bottom of the cone of the Friendship 7 Spacecraft is covered with a heat shield composed of an ablating fiberglass material. Strapped to the base of the capsule were three accelerating rockets for separating the spacecraft from the launch vehicle and three decelerating solid rockets for return to Earth. All of these rockets were designed to be jettisoned just prior to reentry.[2]

Inside the Friendship 7 Spacecraft there is an astronauts couch and a three piece instrument panel. A trapezoidal window is cut into the skin of the spacecraft between the astronaut and the instrument panel to permit a wide field of view during flight.

Gemini 4 Spacecraft

The Gemini 4 Spacecraft was designed for two astronauts instead of one. It is 11 feet high and 7 1/2 feet in diameter at its base and was built by McDonald Aircraft Corporation of St. Louis.

The Gemini Spacecraft was composed of two modules: the reentry module which included the spacecraft cabin, and the adapter module which was jettisoned prior to reentry.[3]

The reentry module includes the spacecraft cabin, control systems, thrusters for orientating the spacecraft during reentry, and parachutes. The Gemini Spacecraft Cabin contains 50 cubic feet of space and has two overhead hatches for egress during spaceflight for EVA. The floor of the cabin has a forward trapezoidal panel upon which the crew's feet rested, and an aft hatch below the seat pans of the couches which open into a compartment containing part of the environmental control system. The bottom of the reentry module contains the heatshield for reentry. During reentry the adapter module was jettisoned.[4]

Apollo 11 Command Module

The Apollo 11 Command Module is 10 feet 7 inches high and 12 feet 10 inches wide at its base. It weighs 14,000 pounds and was built by North American Rockwell.

There are three sections to the command module: the foward section at the apex of the cone, housing two negative pitch reaction control engines and components of the Earth landing system; the middle section containing crew accommodations, controls and displays, and aircraft systems; and the third, or aft, section around the periphery of the cone near the base containing ten reaction control engines and propellant tanks. Total living volume for the three astronauts is 210 cubic feet. The heat shield on the Apollo 11 Command Module consists of a fiberglass honeycomb filled with an elastomeric ablator, over a stainless steel structure.[5]

During flight the Command Module was attached to the Service Module which contained the service propulsion system and reaction control fuel-oxydizer tanks, fuel cells for electric power, cyrogenic oxygen, hydrogen, and onboard consumables.[6] The Service Module was jettisoned prior to reentry and not recovered.

8. Significance

Period	Areas of Significance—Check and justify below				
prehistoric	archeology-prehistoric	community planning	landscape architecture	religion	
1400–1499	archeology-historic	conservation	law	science	
1500–1599	agriculture	economics	literature	sculpture	
1600–1699	architecture	education	military	social	
1700–1799	art	engineering	music	humanitarian	
1800–1899	commerce	exploration settlement	philosophy	theater	
X 1900–	communications	industry	politics government	transportation	
		invention		X other (specify) Space Exploration	

Specific dates 1959-1969 **Builder Architect** McDonald Aircraft Corporation North American Rockwell

Statement of Significance (in one paragraph)

The Mercury Spacecraft Friendship 7, Gemini 4 Spacecraft, and Apollo 11 Command Module are nationally significance because they collectively represented the three classes of spacecraft that were constructed to carry Americans into space and eventually toward the goal of the first manned landing on the Moon in July 1969. All three spacecraft are the actual flight vehicles used in their respective missions. They each carried one or more crew members and were the only parts of the space flight hardware designed to be recovered. Each of these space craft represented a first or breakthrough for its series. For example, Friendship 7 carried John Glenn into space in 1962 as the first American to orbit the Earth; Gemini 4 carried Ed White and saw the completion of his "walk in space", Apollo 11 carried the first men to land on the surface of the Moon. In recognition of these acheivements each of these spacecrafts is now housed in the Milestones of Flight Gallery of the National Air and Space Museum in Washington, DC.

GENERAL HISTORY [7]

Mercury Spacecraft Friendship 7

On February 20, 1962, John H. Glenn, Jr., became the first American to orbit the Earth. He accomplished this feat in the Mercury spacecraft Friendship 7. A modified Atlas missile was the booster.

On the day of the launch, Glenn boarded Friendship 7 at 6:06 a.m. EST. Minor problems delayed the launch several times, but the countdown was completed at 9:47 a.m. and all engines of the Atlas ignited. Five minutes later, John Glenn was in orbit. He checked the spacecraft and found all systems performing as expected.

Near the end of his first orbit, Glenn noticed that Friendship 7 drifted slowly to the right when the automatic control system was on. He switched to manual control and corrected the problem. Mission controllers were pleased about the way Glenn resolved the problem, but they were faced with a potentially far more serious one.

An instrument light at mission control indicated tht the heatshield and compressed landing bag were loose. If this were true, Friendship 7 and its human cargo would be incinerated during atmospheric entry. There was a solution. The retro-rocket package was strapped to the heatshield; if the package were retained after retro-fire, its straps would hold the heatshield in place. By the time pack burned away, aerodynamic pressure would keep the shield from slipping.

Four and a half hours after launch, Glenn was nearing the end of his flight. All three retro-rockets fired while Friendship 7 was over California, slowing it enough to enter the atmosphere. As the heat of entry increased, Glenn saw bits of the retro-package fly past his window. When one of the straps swung in front of the window he knew the package was gone.

The glass-fiber and resin ablative heatshield did its job -- Friendship 7 survived reentry. At an altitude of 28,000 feet, the drogue parachute opened, followed by the main one at 10,000 feet. Glen flipped the landing bag release switch and felt a reassuring "clunk" as the bag and heatshield dropped into position. The premature deployment signal had been nothing more serious than a fault in the ground controller's console.

Friendship 7 splashed down in the Atlantic Ocean 4 hours and 55 minutes after launch. Seventeen minutes later, the destroyer USS Noa was floating alongside, ready to retrieve the bobbing spacecraft. Once the craft was cradled in a mattress pallet on Noa's deck, Glenn fired the explosive bolts holding the hatch in place. When the hot, tired astronaut emerged from the spacecraft, America had a new hero.

Gemini 4 Spacecraft

Astronaut Edward H. White II became the first American to "walk in space" on June 3, 1965. His 22-minute extravehicular activity was one of the most dramatic accomplishments of the United States' manned program. White strolled over North America during the third orbit of the four-day flight of Gemini 4.

Gemini 4 was launched from pad 19 at the Kennedy Space Center (formerly Cape Canaveral) in Florida at 10:16 a.m. EST on June 3, 1965. Less than 10 minutes after lift off, the Titan 2 booster had placed the spacecraft in a 100- by 175-mile high orbit. James A. McDivitt was Gemini 4's command pilot, Edward White was the pilot.

The two-man Gemini was an intermediate step between the single seat Mercury earth-orbiting spacecraft, and the three-man Apollo lunar vehicle. Project Gemini's objectives were to demonstrate the techniques of orbital rendezvous and docking, conduct missions lasting up to two weeks, and to conduct extravehicular activities, or "space walks." Such operations would be needed in a few years for the Apollo lunar flights.

During the third orbit, McDivitt and White depressurized Gemini 4's cabin, and at 2:45 p.m. EST, White opened his hatch and stood up. He had several pieces of specialized equipment for the extravehicular activity. A 25-foot long gold-colored "umbilical," connected him to the spacecraft. The umbilical contained his oxygen supply hose and electrical leads. White wore an emergency

oxygen pack on his chest. If anything went wrong with the umbilical, the pack held a 9-minute oxygen supply. His helmet had a gold-plated outer visor to protect him from the intense ultraviolet radiation from the sun. White also had a small hand-held maneuvering unit.

Soviet Cosmonaut Alexi Leonov had performed the first walk in March 1965 (less than three months before White) and had spent ten minutes floating alongside Voskhod-2, but he did not have any means of controlling his movements. White used his maneuvering unit to pull himself out of the cabin, then translated the length of the spacecraft, and practiced several turns before running out of propellant. The maneuvering unit comprised two tanks with a throttle handle and three thrusters. White spent 22 minutes outside of Gemini 4 before Mission Control ordered him back inside.

After the excitement of the extravehicular activity, McDivitt and White undertook the rest of the mission, which lasted for four days. During the rest of the flight, the astronauts performed medical experiments, photographed Earth, and evaluated the spacecraft's systems. After circling Earth 62 times, Gemini 4 splashed down in the Atlantic Ocean at 12:12 p.m. EST on June 7, 1965. The aircraft carrier USS Wasp recovered the craft, which had traveled a total distance of 1,609,700 miles in space

Apollo 11 Command Module

The Apollo 11 Command Module Columbia was the living quarters for the three-man crew during most of the first manned lunar landing mission in July 1969. On July 16, 1969, Neil Armstrong, Edwin "Buzz" Aldrin, and Michael Collins climbed into Columbia for their 8-day journey. The Command Module was one of three parts of the complete Apollo spacecraft. The other two were the Service Module and the Lunar Module.

The Service Module contained the main spacecraft propulsion system and consumables (oxygen, water, propellants, and hydrogen). The Lunar Module was the part Armstrong and Aldrin would use to descend to the moon's surface.

When Apollo 11 lifted off, the spacecraft and launch vehicle combination stood 364 feet tall. Eight days later, when the flight ended, the only part recovered was the 11-foot tall Columbia Command Module.

For the launch, the Lunar Module was stored in a cone-shaped adapter between the Service Module and the launch vehicle. Once the spacecraft was on its way to the moon, the command and Service Modules (CSM) pulled away from the adapter, turned around, then moved back in to dock with the lunar lander. When the two were linked, the astronauts could crawl between craft via a docking tunnel in

the top of the Command Module. After the CSM/lunar combination reached the moon, Armstrong and Aldrin entered the Lunar Module and undocked from Columbia. Collins remained in lunar orbit aboard Columbia, while his crewmates landed on the surface.

When their surface activites were over, Armstrong and Aldrin took off and rejoined Collins. They fired the CSM's large engine and headed back to Earth. Several days later, on July 24, they discarded the Service Module and entered Earth's atmosphere. Columbia's exterior is covered with an epoxy-resin ablative heatshield. As Columbia entered the atmosphere at a speed of 25,000 miles per hour, its exterior reached a temperature of 2,760° C (5,000°F). This heatshield protected the craft from burning and vaporizing. Columbia finished its flight with a parachute landing in the Pacific Ocean, where USS Hornet retrieved it and its crew.

Footnotes

1. U.S., Congress, House, United States Civilian Space Program 1958- 1978, Vol. 1. 97th Cong., January 1981, p. 348.

2. Ibid.

3. Ibid., p. 362

4. Ibid.

5. Ibid., p. 388

6. Ibid., p. 389

7. All of the historical material given below for the Mercury Spacecraft Friendship 7, Gemini 4, and Apollo 11 Command Module has been taken from the following source.

   Gregory P. Kennedy, Rockets, Missiles and Spacecraft of the National Air and Space Museum (Washington, DC: Smithsonian Institution Press, 1983), pp. 84, 96, and 122.

Bibliography

Brooks, Courtney G., Grimwood, James M., and Swenson, Loyd S. Chariots for Apollo: A History of Manned Lunar Spacecraft. Washington, DC: National Aeronautics and Space Administration, 1979.

Hacker, Barton C. and Grimwood, James M. On the Shoulders of Titan: A History of Project Gemini. Washington, DC: National Aeronautics and Space Administration, 1979.

Kennedy, Gregory P. Rockets, Missiles and Spacecraft of the National Air and Space Museum. Washington, DC: Smithsonian Institution Press, 1983.

Swenson, Loyd S. Jr., Grimwood, James M., and Alexander, Charles C. This New Ocean: A History of Project Mercury. Washington, DC: National Aeronautics and Space Administration, 1966.

U.S. Congress, House. United States Civilian Space Programs 1958-1978 Vol. 1. 97th Congress, 1st Session, January 1981.

9. Major Bibliographical References

SEE CONTINUATION SHEET

10. Geographical Data

Acreage of nominated property N/A

Quadrangle name _____ Quadrangle scale

UTM References

	Zone	Easting	Northing		Zone	Easting	Northing
A				B			
C				D			
E				F			
G				H			

Verbal boundary description and justification

N/A

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Harry A. Butowsky, Staff Historian

organization Division of History date August 14, 1984

street & number 1100 L Street, NW telephone (202) 343-8168

city or town Washington state DC 20240

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national ___ state ___ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89–665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature

title date

For NPS use only

I hereby certify that this property is included in the National Register

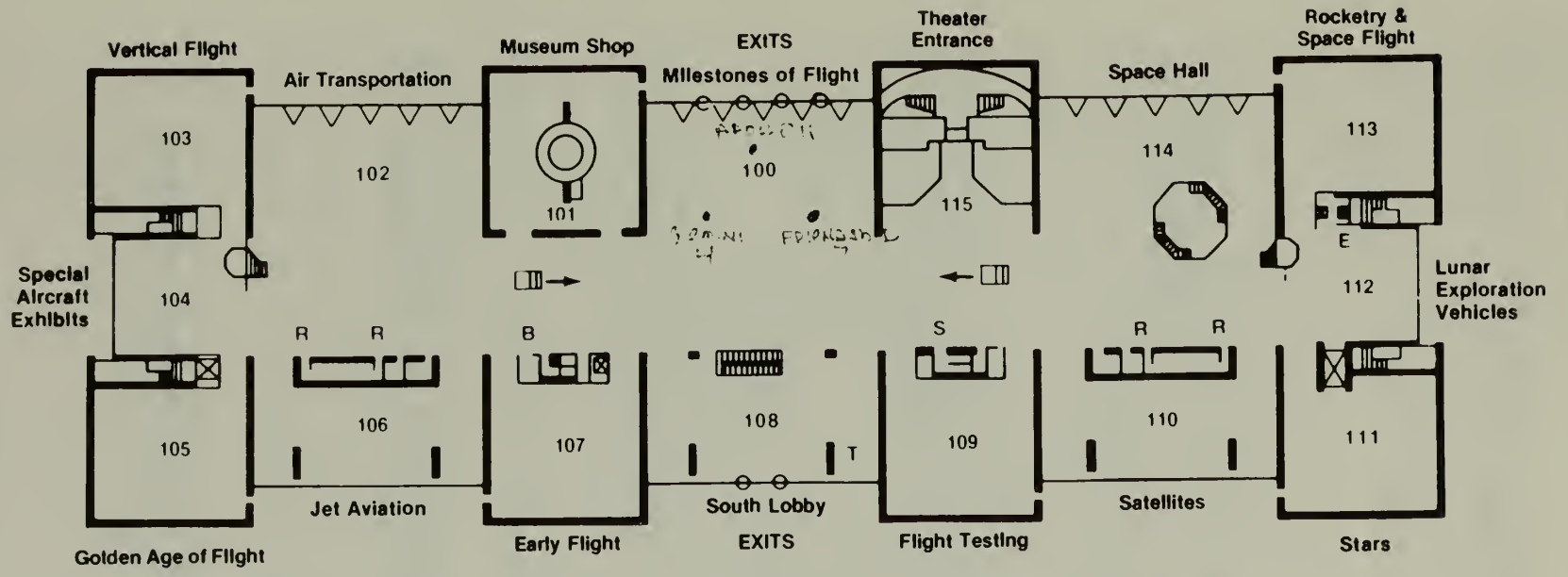
date

Keeper of the National Register

Attest: date

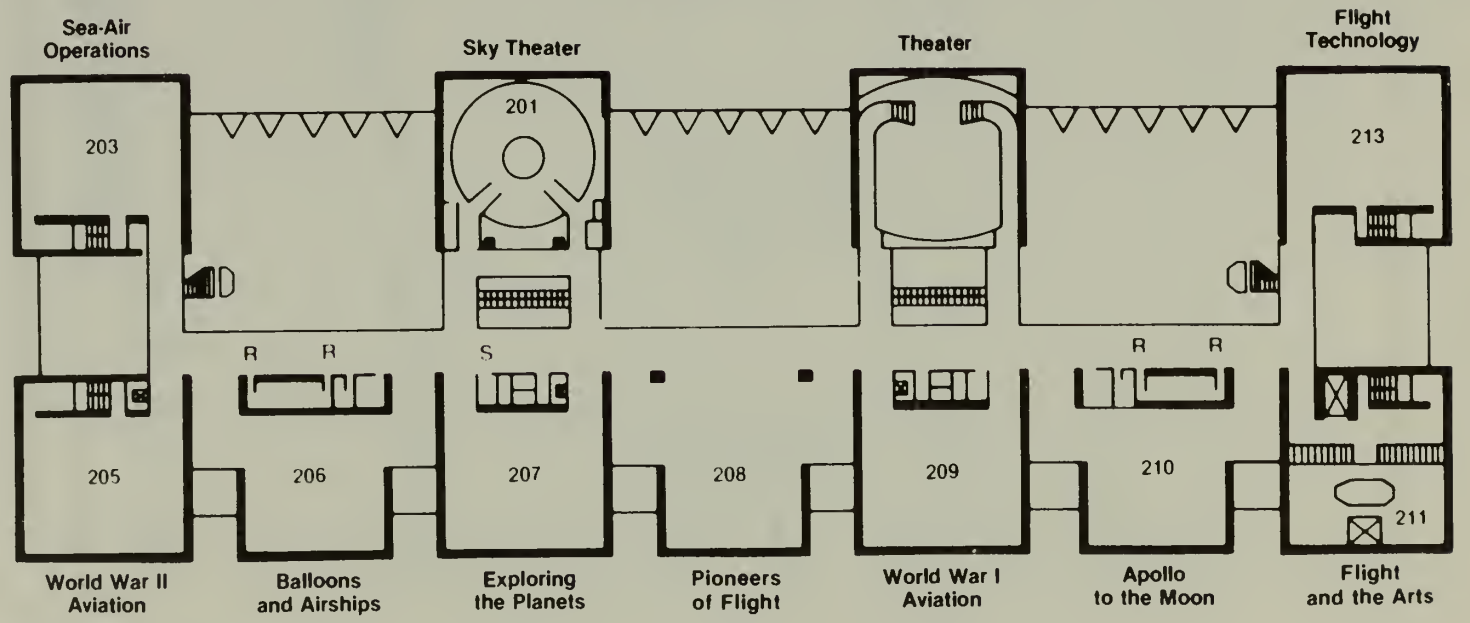
Chief of Registration

GPO 894-788



R Rest Rooms B Baby Service Station T Public Telephones S Gift Shop E Elevator to Food Service

Second Floor



R Rest Rooms S Gift Shop

United States Department of the Interior
National Park Service

For NPS use only

received

date entered

National Register of Historic Places Inventory—Nomination Form

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic White Sands V-2 Launching Site (Launch Complex 33)

and or common White Sands Blockhouse and Gantry Crane

2. Location

street & number White Sands Missile Range ___ not for publication

city, town ___ vicinity of

state New Mexico code 035 county Dona Ana code 013

3. Classification

Category	Ownership	Status	Present Use	
___ district	_X_ public	___ occupied	___ agriculture	_X_ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
___ structure	___ both	___ work in progress	___ educational	___ private residence
_X_ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	_X_ yes: restricted	_X_ government	___ scientific
	___ being considered	___ yes: unrestricted	___ industrial	___ transportation
		___ no	_X_ military	___ other:

4. Owner of Property

name U.S. Army

street & number White Sands Missile Range

city, town White Sands ___ vicinity of state New Mexico 88002

5. Location of Legal Description

courthouse, registry of deeds, etc. Clerk's Office

street & number Dona Ana County Courthouse

city, town Las Cruces state New Mexico 88001

6. Representation in Existing Surveys

title New Mexico State Register of Cultural Properties #6580 has this property been determined eligible? ___ yes ___ no

date 1978 ___ federal ___ state ___ county ___ local

depository for survey records New Mexico State Planning Office

city, town Santa Fe state New Mexico

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	X original site
_X_ good	___ ruins	_X_ altered	___ moved date
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

Launch Complex 33 at the White Sands Missile Range has two important structures: the old Army Blockhouse and the launching crane, also known as the Gantry Crane.

The Army Blockhouse was completed in late September 1945 and was primarily used as an observation point and laboratory in the pioneer development of the V-2 rocket in the United States. Walls of the building are 10 feet thick and its pyramidal roof is of solid reinforced concrete 27 feet thick. The blockhouse is rectangular in shape 60 feet by 40 feet with concrete additions on the south and west sides. One observation window is on the east side and two observation windows are on the west side. The observation windows are covered with a high quality ground glass to allow scientists to view missile firings safely and at close range. The entrance door is on the south addition. A radar unit has been attached to the top of the structure. The blockhouse is currently utilized for the repair and maintenance of instrumentation and gauging devices.

The Gantry Crane was constructed in November 1946 to launch the V-2 and Viking rockets. The crane is a steel tower 75 feet tall and 25 feet wide. It is equipped with four platform levels for the placement of various types of rockets. The platforms swing toward the center of the crane from the two framed metal stands forming the vertical supports. Block-and-tackle pulleys descend from the top horizontal platform to assist in the placement of rockets. The crane is moved on tracks prior to a rocket launch. Underneath the concrete launch pad is a flame bucket for the rocket exhaust and a water spillway. The launch pad is concrete and is 365 feet by 372 feet. After the completion of the V-2 program the Gantry Crane was modified to support testing of the Army's Redstone Missile.[1]

The Gantry Crane has been restored by the Army to its original V-2 configuration. At the present time a Viking rocket is displayed for launching in the Gantry Crane.

8. Significance

Period	Areas of Significance—Check and justify below				
prehistoric	archeology-prehistoric	community planning	landscape architecture	X	religion
1400–1499	archeology-historic	conservation	law		science
1500–1599	agriculture	economics	literature		sculpture
1600–1699	architecture	education	X military		social
1700–1799	art	engineering	music		humanitarian
1800–1899	commerce	exploration settlement	philosophy		theater
X 1900–	communications	industry	politics government		transportation
		invention		X	other (specify) Space Exploration

Specific dates 1945-46 **Builder Architect** U.S. Army

Statement of Significance (in one paragraph)

Launch Complex 33 is significant because of its close association with the V-2 and the origins of the American Rocket Program. Launch Complex 33 was developed specifically to accommodate V-2 rocket tests at White Sands. The V-2 Gantry Crane and Army Blockhouse represent the first generation of rocket testing facilities that eventually would lead to the American exploration of Space and the first manned landing on the moon. This site test fired 67 V-2 rockets between 1946 and 1951, the first major rocket firings conducted in the United States. The V-2 was the first vehicle to carry scientific instruments into the upper atmosphere and the first large rocket with a liquid propellant motor. The V-2 provided the technological base upon which the United States would build to develop the Saturn family of rockets that eventually carried Americans to the moon and beyond.[2]

General History

The German V-2 Rocket (Vergeltungswaffen-2, or "weapon of retailation") was the most advanced rocket of its type in 1944-45. The V-2 was 46 feet long, 5.5 feet wide, and developed a thrust of 56,000 pounds. The V-2 was developed to support the German war effort and by 1945 hundreds of these rockets were launched against Allied targets in England and on the continent of Europe.

At the end of the war the American government in Operation Paperclip captured more than 100 V-2 rockets and numerous German scientists and engineers associated with the V-2 development program including Dr. Werner Von Braun. The Army brought Dr. Von Braun and the captured V-2s to the newly opened White Sands Missile Range in New Mexico. By March 1946 the first captured V-2 was static test fired at White Sands and in April 1946 the first V-2 was launched.

In the years from 1946 to 1951 while the Air Force concentrated on cruise missiles, the Army generated an increasing expertise in rocket technology based upon the experience and work of Dr. Von Braun at the White Sands Missile Test Range. During these years the Army launched 67 V-2s from White Sands establishing high altitude and velocity records that reached to the very edge of space. From these experiments, under the leadership of Dr. Von Braun, emerged the first generation of American built rockets such as the Corporal, Redstone, Nike, Aerobee and Atlas.

At the conclusion of the testing program for the V-2, the Army transferred its rocket team under Dr. Von Braun to the Redstone Arsenal in Huntsville, Alabama, to continue work on basic research and prototype development of new rockets. From this work would emerge the new generations of American rockets that would take Americans into space in the late 1950s and 1960s.

While the White Sands Missile Test Range would continue to test rockets and other areas such as Cape Canaveral and Vandenberg Air Force Base would test later generations of rockets only Launch Complex 33 at the White Sands Missile Test Range can lay claim to have tested and launched the very first generation of technologically sophisticated rockets that enabled Americans to probe to the very edge of space.

Bibliography

Bilstein, Roger B. Stages to Saturn: A Technological History of the Apollo/Saturn Launch Vehicles. Washington, D. C.: National Aeronautics and Space Administration, 1980.

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Buchanan, David G. and Johnson, John P. V-2 Gantry Crane Launch Complex 33. HABS/HAER Inventory Card, Silver Spring, Maryland: Building Technology Inc., 1983.

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Fact Sheet. V-2 Story. Information Office, White Sands Missile Range, 1974.

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Ordway, Frederick I. and Mitchell R. Sharpe. The Rocket Team. New York: Crowell, 1979.

Footnotes

1. New Mexico State Register of Cultural Properties State Inventory Form #0580, White Sands V-2 Launch Site (1978), pp. 1-3.

   Buchanan, David G., and Johnson, John P. Army Blockhouse Launch Complex 33, HABS/HAER Inventory Card, (Silver Spring: Maryland, Building Technology Inc., 1983).

   Buchanan, David G., and Johnson, John P. V-2 Gantry Crane Launch Complex 33, HABS/HAER Inventory Card, (Silver Spring: Maryland, Building Technology Inc., 1983).

2. Draft Historic Properties Report, White Sands Missile Range, New Mexico and Subinstallation Utah Launch Complex, Green River, Utah, (Draft), (Silver Spring, Maryland: Building Technology Inc., 1983), pp. 105-106.

9. Major Bibliographical References

SEE CONTINUATION SHEET

10. Geographical Data

Acreage of nominated property 10 acres

Quadrangle name _____ Quadrangle scale 1:24:000

UTM References

	Zone	Easting	Northing
A	1 3	3 7 0 4 2 0	3 5 8 5 5 4 0
B			
C			
D			
E			
F			
G			
H			

Verbal boundary description and justification

The boundary for Launch Complex 33 is drawn in green on the attached map titled "Launch Complex 33 Boundary map"

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Harry A. Butowsky, Historian

organization National Park Service date August 1, 1984

street & number 1100 L Street, NW telephone (202) 343-8168

city or town Washington state DC 20240

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national ___ state ___ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature

title date

For NPS use only

I hereby certify that this property is included in the National Register

date

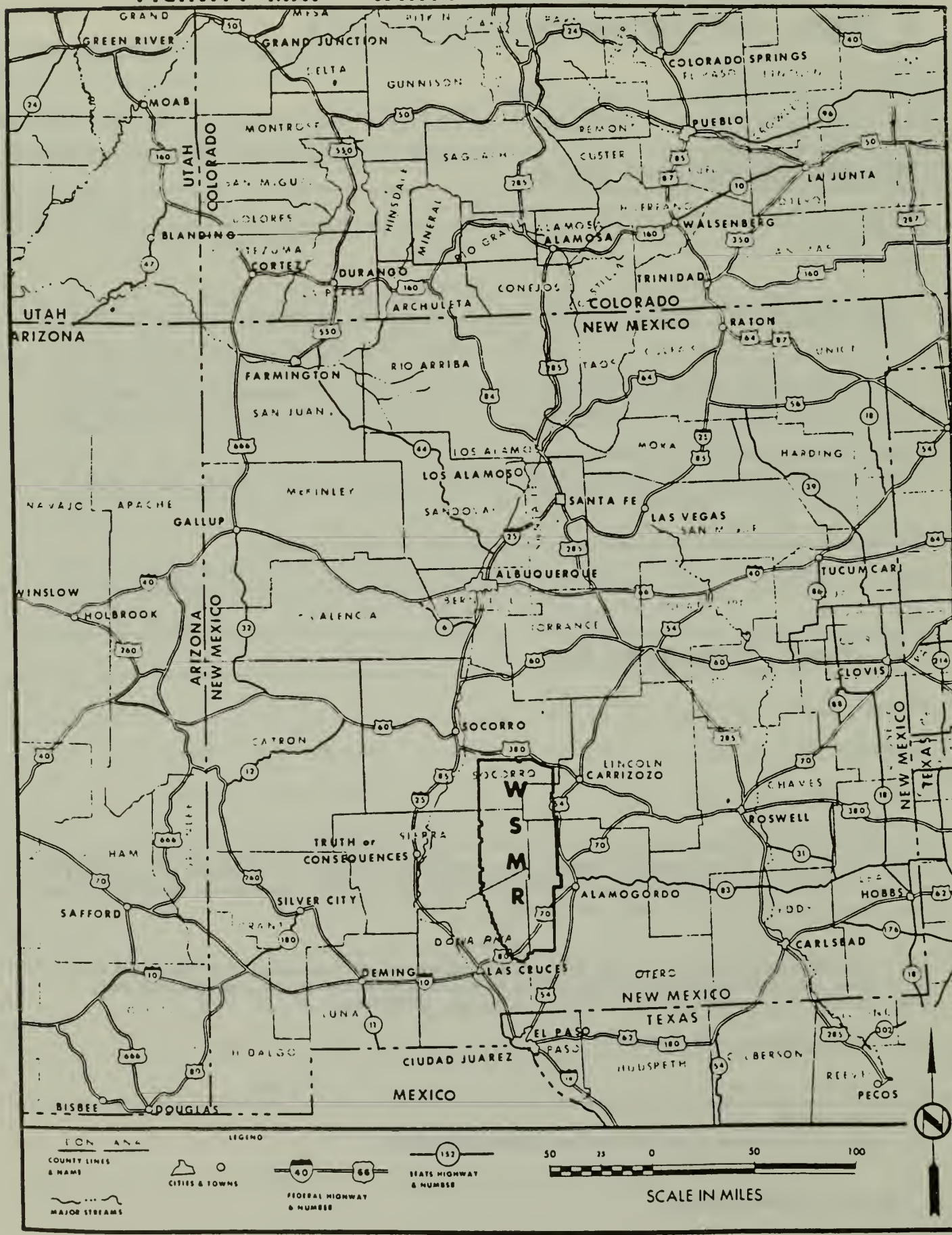
Keeper of the National Register

Attest: date

Chief of Registration

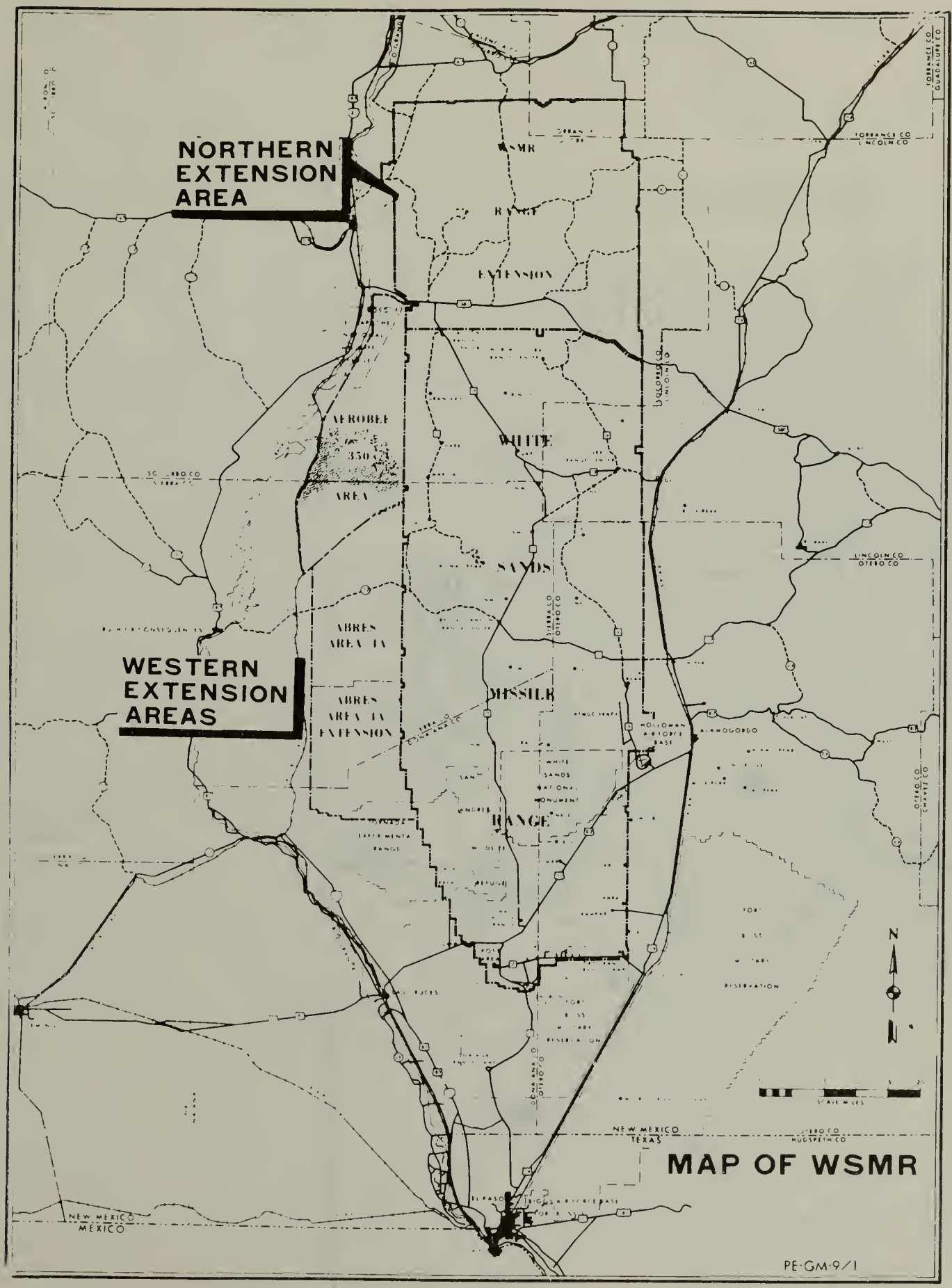
GPO 894-788

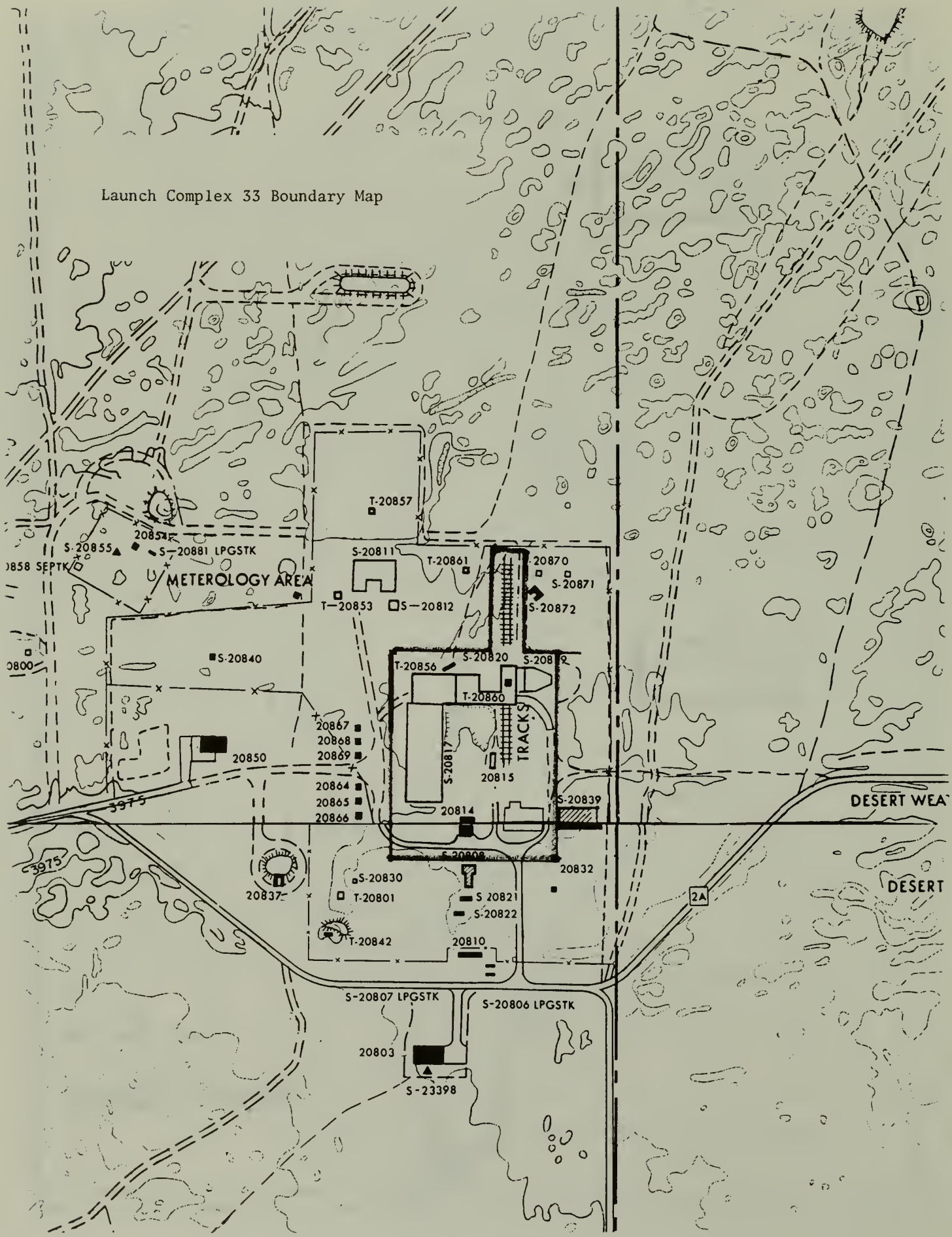
VICINITY MAP - WHITE SANDS MISSILE RANGE

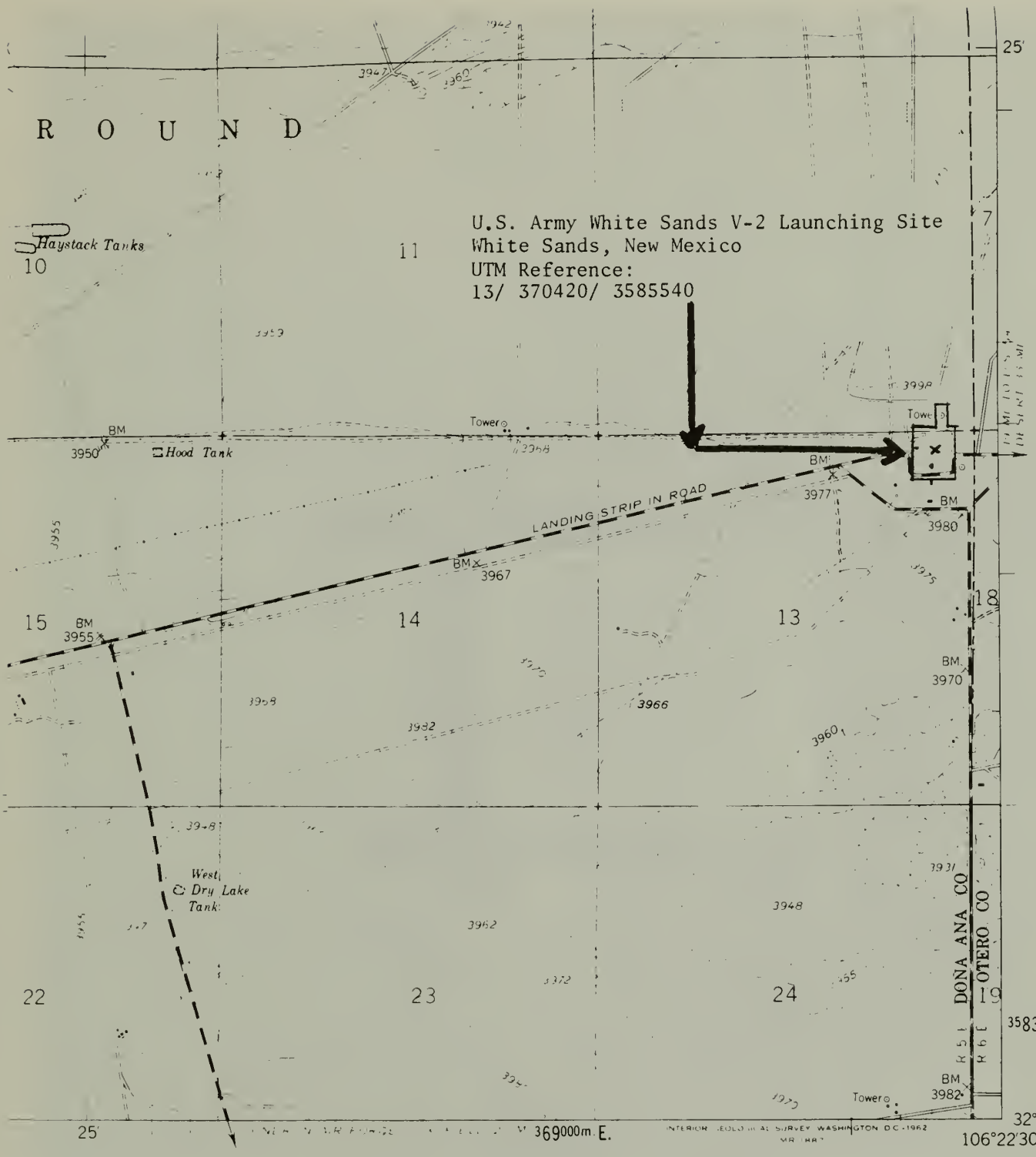


1-A

Figure 1


NORTHERN EXTENSION AREA
WESTERN EXTENSION AREAS
WSMR
RANGE
EXTENSION
AEROBEE
350
AREA
WHITE
SANDS
ABRES
AREA IA
ABRES
AREA IA
EXTENSION
ORNSILR
RANGE
HOLLOMAN AIR FORCE BASE
ALAMOGORDO
WHITE SANDS NATIONAL MONUMENT
TORRANCE CO
LINCOLN CO
OTERO CO
CHAVES CO
DONA ANA CO
SIERRA CO
SOCORRO CO
NEW MEXICO
TEXAS
NEW MEXICO
MEXICO
MAP OF WSMR
PE-GM-9/1


Launch Complex 33 Boundary Map
T-20857
20854
S-20855
S-20881 LPGSTK
0858 SEPTK
METEROLOGY AREA
S-20811
T-20861
20870
S-20871
T-20853
S-20812
S-20872
S-20840
T-20856
S-20820
T-20860
TRACKS
20867
20868
20869
20850
S-20817
20815
20864
20865
20866
3975
20814
S-20839
DESERT WEA
S-20808
20832
20837
S-20830
T-20801
S 20821
S-20822
DESERT
2A
T-20842
20810
S-20807 LPGSTK
S-20806 LPGSTK
20803
S-23398


U.S. Army White Sands V-2 Launching Site
White Sands, New Mexico
UTM Reference:
13/ 370420/ 3585540
R O U N D
Haystack Tanks
Hood Tank
LANDING STRIP IN ROAD
West Dry Lake Tank
DOÑA ANA CO
OTERO CO
3583000m. N.
369000m. E.
32°22'30"
106°22'30"
25'
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
U.S. Route
NEW MEXICO
QUADRANGLE LOCATION
WHITE SANDS, N. MEX.
NW/4 WHITE SANDS 15' QUADRANGLE
N3222.5—W10622.5/7.5
1955

1. White Sands V-2 Launching Site
2. White Sands Missile Range, New Mexico
3. U.S. Army
4. 1984
5. U.S. Army Public Affairs Office White Sands
6. New Mexico State Historic Landmark Sign at Entrance to Launch Site
7. 1

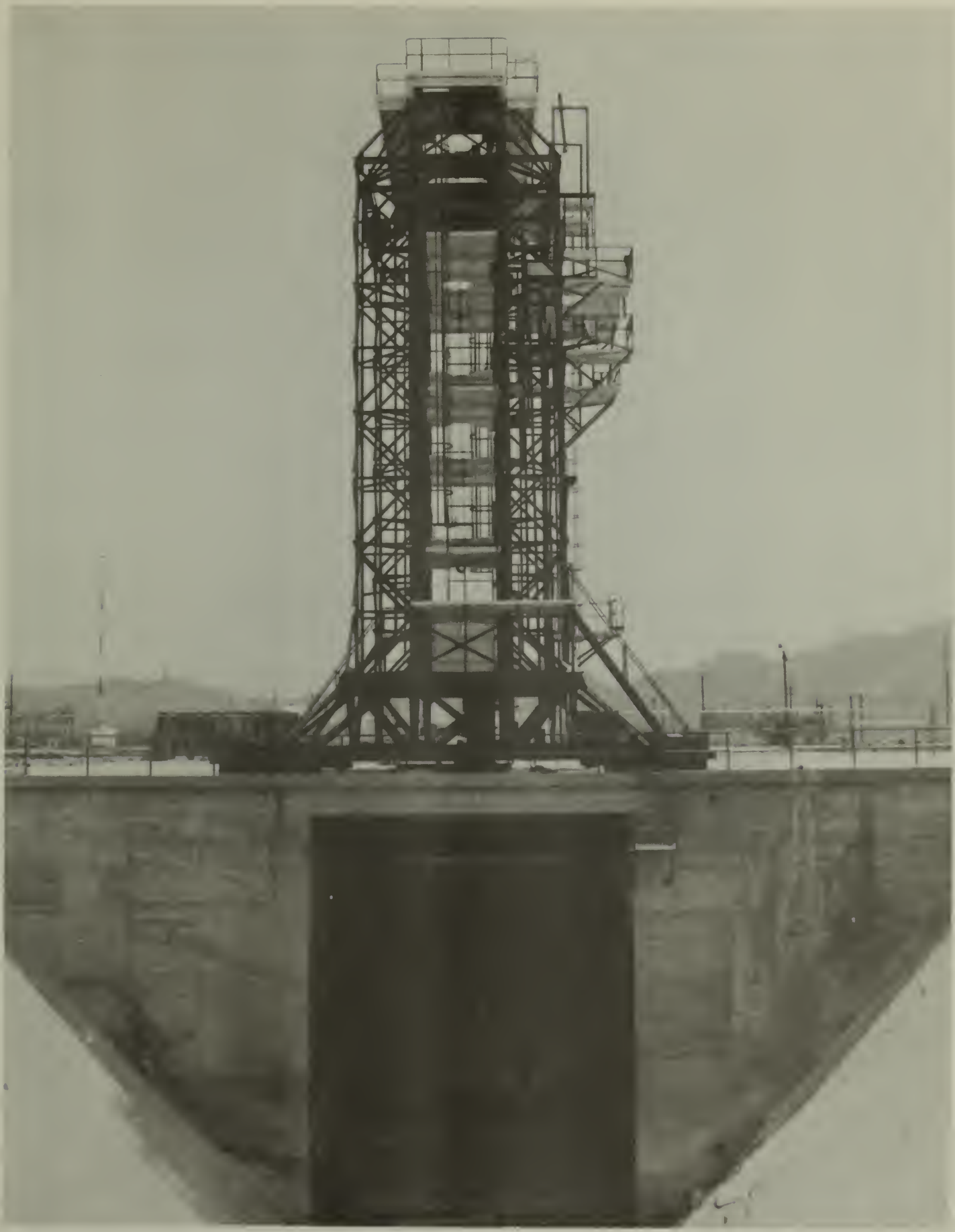

ARMY
BIRTHPLACE OF U.S.
MODERN MISSILES
HERE ON JULY 9,1945 WHITE SANDS PROVING GROUND, AMERICA'S FIRST MISSILE TEST FACILITY WAS BORN. THE NEXT DAY CONSTRUCTION BEGAN ON THE BLOCKHOUSE. A GANTRY CRANE WAS SOON ADDED AND FLIGHT TESTING OF CAPTURED GERMAN V-2 ROCKETS BEGAN, LEADING TO TODAY'S MODERN MISSILES AND SPACE EXPLORATION.

1. White Sands V-2 Launching Site
2. White Sands Missile Range, New Mexico
3. U.S. Army
4. 1946
5. U.S. Army Public Affairs Office White Sands
6. Gantry Crance with V-2 Missile in Place
7. 2

1. White Sands V-2 Launching Site
2. White Sands Missile Range
3. U.S. Army
4. 1982
5. U.S. Army Public Affairs Office White Sands
6. Aerial View of Blockhouse and Gantry Crane
7. 3


ARMY

1. White Sands V-2 Launching Site
2. White Sands Missile Range
3. U.S. Army
4. 1982
5. U.S. ARmy Public Affairs Office White Sands
6. View of Flame Bucket under the Launch Pad
7. 4



1. White Sands V-2 Launching Site
2. White Sands Missile Range
3. U.S. ARmy
4. 1984
5. U.S. Army Public Affairs Office White Sands
6. Hermes Missile in place on Launch Pad
7. 5

1. White Sands V-2 Launching Site
2. White Sands Missile Range
3. U.S. Army
4. 1984
5. U.S. Army Public Affairs Office
6. Exterior View of Blockhouse
7. 6


ARMY

1. White Sands V-2 Lauching Site
2. White Sands Missile Range
3. U.S. Army
4. 1984
5. U.S. Army Public Affairs Office
6. Marker in front of V-2 Gantry Crane
7. 7

VON BRAUN
V-2 GANTRY CRANE

ERECTED 1946

THIS UNIQUE STRUCTURE WAS USED IN THE DEVELOPMENT OF AMERICA'S FIRST MODERN ROCKETS AND IS WHERE MAN TOOK THE FIRST STEP TO THE MOON.

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